Effect of Digital Transformation on Adoption of an Effective Virtual Workplace in Organizations

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***Abstract*—— In this hyper-competitive era, firms are increasingly transforming their business operations through advanced digital technologies and remotely. The days of simply testing and discussing the effects of digital transformation are gone, but the time for actionable measures has come. Therefore, this study has identified the role of digital transformation including big data, cyber-physical systems, internet of things and interoperability, on the adoption virtual workplace in organizations. Based on the Theory of Resource-Based View (RBV) and Technology Acceptance Model (TAM) are adequate for this analysis, an explanatory research approach was followed with the objective of determining the influence of digital transformation elements namely Big Data, Internet of Things, Cyber Physical Systems and Interoperability on adoption of an effective virtual workplace. The model was tested quantitatively by means of online survey, for which a total of 61 valid responses were received. In this study, Big data, cyber-physical structures, and interoperability have been found to have a substantial positive effect on the implementation of a virtual workplace through implementing Pearson correlation techniques through SPSS, thus contributing to policy and research practice.**

Keywords— Digital transformation, Virtual Workplace Adoption, Technology

I. INTRODUCTION

Digital transformation (DT) has emerged as a significant factor in recent years in strategic business leadership phenomenon [1], [2] and for practitioners [3], [4]. At a substantial stage, digital transformation encompasses the fundamental shift taking place in society and industries using emerging technologies [5], [6]. At the institutional level, it's been argued that firms should notice ways in which to experiment with these innovations by developing ways that settle for the results of digital transformation and drive improved operational potency [7].

Research has shown that technology itself is simply a part of the dynamic puzzle that has to be solved for firms to remain competitive during a digital atmosphere, in line with previous findings on IT-enabled transformation. Strategy as well as improvements to an enterprise [1], [13], including its structure [8], processes and culture [9] are needed to have the opportunity to create new pathways for value development [10]. We currently lack a thorough understanding of this phenomenon, despite these contributions [11], [12], [13] as well as its ramifications at various levels of study. "Therefore, the present work proposes to take stock of current knowledge on the subject by examining the research question: "What do we know about processes of digital transformation to implement an efficient virtual workplace in organizations?". We then create a conceptual definition of DT based on existing definitions as "a process that aims to improve an entity through a combination of information, computing, communication and connectivity technologies by triggering significant changes to its properties" [14]. Based on the literature review, we then present an inductive framework defining DT as a mechanism in which organizations respond to changes taking place in their environment by embracing the virtual workplace to change their processes of value creation.

First, we deliver an analysis that incorporates existing awareness of organizations' digital transformation processes. Second, we define avenues that future research can use as a guide to address pressing questions about organizational DT processes while helping to broaden the theoretical foundations on which we rely to study the virtual workplace.

II. LITERATURE REVIEW AND HYPOTHESIS

A. Impacts of Digital Transformation Processes on Virtual Workplaces in Smart Cities

Due of the use of ICT to transform life and work within a city in significant and fundamental ways, technology is the key to becoming a smart city. It is completely important to have a well-functioning infrastructure, but not enough to become a smart city. IT infrastructure and applications are prerequisites, but there is no smart city without genuine commitment and willingness to collaborate and cooperate with public institutions, the private sector, voluntary organizations, schools and citizens [14].

Organizations introduce radical business changes as businesses develop new technology-enabled business capabilities. In most of the companies, we analyzed, the virtual teams were first and most deeply impacted by these changes. For virtual services selected by its business customers, it now designs standard assemblies [14]. The company created digital business as part of his digital transformation, comprising teams focused on the

organizational backbone and teams primarily responsible for digital innovation through the construction and maintenance of digital services.

Some virtual teams serve as integrators to allow new criteria for integration across vertical business units. In certain companies, the CIO assigned two architects solely to facilitate improvements affecting various parts of the business so that the company could carry out its digitized solutions strategy. As companies create seamless customer relationships and digitized solutions, many are reorganizing their virtual teams around services. The Technology Adoption model, according to the Kaiser Permanente Chief Technology Officer, is a major shift from providing resources to a few high-value ventures to funding a large number of small transactions because it reduces the barrier to entry, reducing the risk of failure and the cost of entry [15]. Although the IT department was typically the first part of a business to transform, participants in our study often expected that improvements in the IT department would ultimately be replicated in the entire business. In many organizations, new digital services have provided for quicker advances in service delivery [15.

B. Digital Transformation and its Factors of Adopting a Virtual Workplace

Advanced human capital is needed to allow digital transformation and the adoption of virtual workplaces in businesses. Each sector and department of an organization should be willing to undergo such a technological transformation [16]. IoT, big data, cyber physical systems (CPS), and interoperability are among the digital transformation factors examined in this study [14]. These innovations have the potential to allow a paradigm shift in business settings [16], and the phenomenon itself can be defined as a technology drive.

Hypothesis 1: Big data has a positive impact on the adoption of an effective virtual workplace.

Hypothesis 2: CPS has a positive influence on adoption of an effective virtual workplace.

Hypothesis 3: Interoperability has a positive influence on adoption of an effective virtual workplace.

Hypothesis 4: Internet of Things (IoT) has a positive impact on adoption of an effective virtual workplace.

C. Organizational Behavior and its Factors of Adopting a Virtual Workplace

[17] described attitude as the positive or negative feelings that a person or organization has about implementing a target behavior. [18] pointed out that, the behavior of employees has a relationship with adoption of virtual workplace. The behavioral orientation of the employees is heavily dependent on the favorable attitude of the employees towards the system. [19] developed the diffusion of innovation theory and identified factors that can influence how the systems are adopted by employees. In one of the classic studies, [20] developed a technology adoption model which involves perceived ease of use, perceived usefulness, user adoption of innovation and behavioral intention [21].

Hypothesis 5: The perceived ease of use has a positive and significant impact on the organizational behavior of adopting virtual workplace

Hypothesis 6: The recognized utility will have a positive and significant impact on the organization's adoption of virtual workplace.

Hypothesis 7: Organization innovativeness has a positive and significant effect on organization behavior towards the adoption of virtual workplace.

Hypothesis 8: Behavioral Intention to use has a positive and significant effect on organization behavior towards the adoption of virtual workplace

III. METHODOLOGY

To evaluate the influence of digitalization of firms towards the adoption of virtual workplace, four major digitalization factors and four organizational factors were considered. The theoretical underpinnings of the Resource-Based View (RBV) and Technology Acceptance Model are adequate for this analysis.

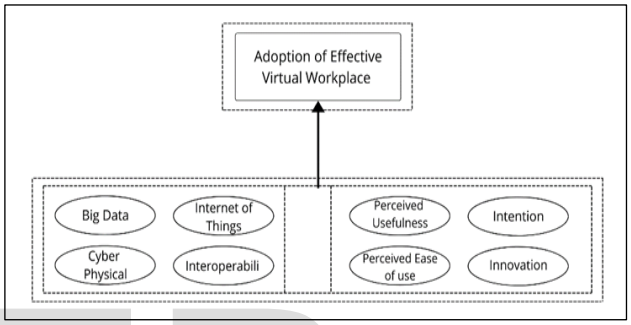

Fig. 1. Shows the relevant factors influencing adoption of effective virtual workplace.

The questionnaire was distributed through various online platform to various organizations across the globe. A sampling table of 72 questionnaires were distributed and 62 valid responses were received. The respondents of this study were employees of managerial level and above who have knowledge of virtual workplace and digital transformation. Random sampling was used for respondents' selection. The data were collected using the 5-point Likert scale from strongly disagree to strongly agree. The questionnaire was divided into two major parts [22]. The first part included demographic items such as age, gender, marital status, and years of managerial experience and the second part regarded the key variables of this research derived from digitalization and organizational factors. The questionnaire was adapted from previous relevant studies [23], [24], [25]. This study applied Pearson Correlation method through SPSS to analyze the data.

IV. ANALYSIS AND RESULTS

In the aspect to measure the big data as a factor of DT that improves the organization's virtual work efficiency, "Big Data improves operational efficiency of the organization's virtual workplace" supports the hypothesis H1 with statistically significant results with high correlation between the variables (**β = 0.719, p < 0.01)**. To measure the significance of the CPS positive influence over effective adoption to virtual work place, Organization's performance and productivity and ease of the job perfection is related **(β=0.376, p = 0.003)**, thus supporting the hypothesis H2.

To measure the statistical significance of interoperability as a DT factor, "Interoperability improves operational efficiency of the organization's virtual workplace", brings out the correlation with employee's priority to DT (**β = 0.420, p < 0.01)**, thus, supporting the hypothesis H3. To measure the relativity between IOT and its communication aspects in virtual workplace, "IOT improves communication efficiency of the organization's virtual workplace" is frames and the results are statistically significant with good correlation between the variables. **(β=0.528, p < 0.01)**, thus, supporting the hypothesis H4. To measure the significance of the organizational behaviour in ease in use of DT, accomplishing task and job ease is measured and related to each other **(β=0.710, p < 0.001)**, thus supporting the hypothesis H5.

In the aspect to measure the organizational behavior and its factors towards DT in virtual workplace, we start with quantifying the perceived simple use by framing the question "Digital transformation system makes it easy to learn how to carry out operation in a virtual workplace". The result **(β=0.574, p <0.01)**, is statistically significant that supports the hypothesis H5. The perceived usefulness of the DT in virtual workplace is measure by assigning "Digital transformation systems enable employees to accomplish tasks more quickly in the organization's virtual workplace, Digital transformation systems makes it easier to do the job with perfection". The results **(β=0.529, p < 0.01) and (β = 0.540, p < 0.01)** are statistically significant that supports the hypothesis H6.

The innovative aspect of the DT in virtual workplace is measure by assigning "Digital transformation systems create an innovative structure of the organization". The results **(β = 0.474, p < 0.01)** is statistically significant that supports the hypothesis H7. However, all the proposed hypothesis are quantified through questionnaire survey; some of them are left back without any statistical significance among the variables. The analysis carried out validated some of the hypothesis from theory and the results are discussed below. To measure the significance of the behavioural intention towards DT, the ease in carrying out operations and the ease in job accomplishment and perfection is considered and related **(β=0.383, p = 0.002),** thus supporting the hypothesis H8.

a) Investigation into the extent to which Big data has a positive influence on adoption of an effective virtual workplace was carried out.

TABLE I. EVALUATION OF BIG DATA INFLUENCE ON ADOPTION OF VIRTUAL WORKPLACE

H1	**Result of analysis**		
	statement	***B value***	***P value***
Significant	Big data has a positive influence on adoption of an effective virtual workplace	**0.719**	**< 0.01**

b) Investigation into the extent to which CPS has an influence on adoption of an effective virtual workplace was carried out.

TABLE II. EVALUATION OF CPS INFLUENCE ON ADOPTION OF VIRTUAL WORKPLACE

H2	**Result of analysis**		
	statement	***B value***	***P value***
Significant	CPS has a positive influence on adoption of an effective virtual workplace	**0.376**	**< 0.03**

c) Investigation into the extent to which Interoperability has a positive influence on adoption of an effective virtual workplace was carried out.

TABLE III. EVALUATION OF INTEROPERABILITY ON ADOPTION OF VIRTUAL WORKPLACE

H3	**Result of analysis**		
	statement	***B value***	***P value***
Significant	Interoperability has a positive influence on adoption of an effective virtual workplace	**0.420**	**< 0.01**

d) Investigation into the extent to which Internet of Things (IoT) has a positive influence on adoption of an effective virtual workplace was carried out.

TABLE IV. EVALUATION OF INTERNET OF THINGS ON ADOPTION OF VIRTUAL WORKPLACE

H4	**Result of analysis**		
	statement	***B value***	***P value***
Significant	Internet of Things (IoT) has a positive impact on adoption of an effective virtual workplace	**0.528**	**<0.01**

e) Investigation into the extent to which Perceived ease of use has a positive influence on adoption of an effective virtual workplace was carried out.

TABLE V. EVALUATION OF PERCEIVED EASE OF USE INFLUENCE ON ADOPTION OF VIRTUAL WORKPLACE

H5	**Result of analysis**		
	statement	***B value***	***P value***
Significant	The perceived ease of use has a positive and significant impact on the organizational behavior of adopting virtual workplace	**0.710**	**< 0.001**

f) Investigation into the extent to which recognized utility has a positive influence on adoption of an effective virtual workplace was carried out.

TABLE VI. EVALUATION OF PERCEIVED USEFULNESS ON ADOPTION OF VIRTUAL WORKPLACE

H6	**Result of analysis**		
	statement	***B value***	***P value***
Significant	The recognized utility will have a positive and significant impact on the organization's adoption of virtual workplace.	**0.529**	**< 0.01**

g) Investigation into the extent to which Organizational innovativeness has a positive influence on adoption of an effective virtual workplace was carried out.

TABLE VII. EVALUATION OF ORGANIZATION INNOVATIVENESS ON ADOPTION OF VIRTUAL WORKPLACE

H7	**Result of analysis**		
	statement	***B value***	***P value***
Significant	Organization innovativeness has a positive and significant effect	**0.474**	**< 0.01**

H7	Result of analysis		
	statement	*B value*	*P value*
	on organization behavior towards the adoption of virtual workplace		

h) Investigation into the extent to which Behavioral intention has a positive influence on adoption of an effective virtual workplace was carried out.

TABLE VIII. EVALUATION OF BEHAVIORAL INTENTION TO USE ON ADOPTION OF VIRTUAL WORKPLACE

H8	Result of analysis		
	statement	*B value*	*P value*
Significant	Behavioral Intention to use has a positive and significant effect on organization behavior towards the adoption of virtual workplace	**0.383**	**< 0.002**

V. DISCUSSION

In a digital economy, digital transformation is described as the integration of digital technology and business processes [26]. A more expansive view sees it as the use of creativity to radially improve the execution or scope of business projects [27]. A more precise identification due to digital transformation requires three organizational aspects: externally, improving the customer experience and changing its entire life cycle; internally, the impact on business objectives, basic leadership, and hierarchical structure; Generally, when all sectors and business opportunities are affected, it usually leads to a completely new business model. The depicted concept of digital transformation demonstrates that its multifaceted existence outperformed previous IT-enabled transformations, resulting in new transformations. This is supported by the fact that DT has recently been regarded as one of the real challenges in all sectors, without exception, and that, despite organizations' recognition of its fundamental importance, they still face numerous obstacles that prevent them from beginning, let alone profiting from, digital transformation. They are competing for business gains by advancing new digital technologies, because competitive demand leads to lowering of common barriers [28]. This may be due to a lack of understanding of the unique accessibility components and options that managers should consider in their transformation methods [26]. [3] It is recommended that a small number of organizations be dominant in establishing mechanical and privilege management capabilities to absorb the transformative influence of new digital innovations [5].

We thereby conclude that digital transformation is a more perplexing type of technology-enabled business transformation that must resolve the critical roles of modern digital advancements and capacities for successful digital development in the digital world [27]. This research describes it as a process by which organizations discover many new digital innovations and update them through a common network. The purpose is to change various business indicators (such as business models, customer experience, digital projects and administrative management, tasks). (Including process and basic leadership), and affect both individuals (computing ability, culture) and systems (computing the entire framework of respect).

From the results of the analysis, this study concludes with the interpretation that the preference and degree of use of the digital transformation are the influencing factors for the positive effect over the organization's virtual workplace. From the correlation, it is well explored that the digital transformation factors drive the organizations change factor in virtual workplace in an improving angle. The results revealed that in overcoming the various challenges of the virtual workplace, digital transformation is of major importance. In particular, the most valuable performance improvement factors are four digital transformation factors (big data, cyber physical systems (CPS), Internet of Things (IoT), and interoperability). The implementation of the new technologies can enhance different operations in the virtual workplace through these components. Thus, the virtual workplace requires the adoption of digital transaction through a comprehensive plan, which should cover the four factors. Organizations need to implement new organizational frameworks and processes that enable their people to collaboratively experiment with technology and deliver their customers with integrated products and services in order to thrive digitally.

Digital technologies have thereby created a moment of truth for virtual workplaces: they bring new customer expectations, younger, more nimble competitors and revolutionary managerial approaches. Since past success does not ensure future success, virtual workplaces will need to keep abreast of the latest digital transformation systems so as to continue taking advantage of digital era opportunities. Organizations must select either a strategy for customer engagement or digitized solutions, and this option will shape priorities for the construction of two critical assets that are activated by technology: an organizational backbone and a platform for digital services. For essential transactional and decision-making capabilities, the organizational backbone would guarantee scale efficiencies. The digital services platform would ensure rapid innovation for consumers in vital digital offerings [29]. These two assets enable companies to integrate the digital strategies of their choice and ultimately provide customer experience and digital solutions. For traditional businesses, letting go of legacy structures, processes and cultures is not easy. They must embark on a lengthy journey to turn themselves into digital companies.

VI. CONCLUSIONS AND RECOMMENDATIONS

This study investigated the impact of digital transformation on the adoption of virtual workplace. The essential positive role of big data, CPS, and interoperability in improving the efficiency of organizations has been checked. Organizations need to be facilitated and encourage to adopt such technologies in their operations extensively, thus not only reducing cost and increasing productivity, but also adding extra value to their products/services. Furthermore, the appropriate type of human capital equipped with modern-day skills is inevitably needed in order to comply with the advanced business settings of digital transformation.

It is evident from the empirical findings that the implementation of the digital transformation seems to be fairly successful within the organization' virtual workplace. Moreover, organizations should be an emphasis when highlighting usefulness and ease of use of the digital transformation components to make the employees more aware and prompted [30]. Consequently, the findings of this

study provide important insights into making more successful approach to adopt and implement an effective virtual workplace in an organization, as well as encouraging managers to utilize various institutional powers so that employees will be more likely to use the digital transformation components that can lead to enhancing knowledge acquisition, communication quality and decision quality.

The strategic digital transformation plan expects companies to make the right key decisions in several key areas. This section includes the decisions found in this article, which are summarized below.

From a business standpoint, an overarching business case must be developed, within which the long goals should be clearly outlined, outweighing the mere need for fast gains. selections on the attainable want for a general modification readiness assessment with the tip goal of understanding this state of Associate in Nursing organization's execution and distinguishing potential issues, weaknesses, opportunities, and also the associated dangers square measure powerfully related to this [31], [32].

While introducing new rising advancements into organizations, innovative technical choices are critical. The role of developments in the firm's achievement of critical objectives is one of the areas being examined here. This can be separated into a motivating role for new business ventures or a stable job to meet current business needs. Nearly synonymous with that is a company's attitude toward emerging technologies and its ability to use them for potential business goals. The partnership with investments helps one to predict the potential effect of emerging technologies on business [12], as well as propose special change projects to ensure that the company develops in lockstep with technology [33].

In light of developments in client contact, a number of critical decisions must be made. Organizations are encouraged to investigate potential new benefits derived from digitally enhanced improvements to the client venture [34]. This can be achieved by looking at all of the client touch points and integrating the organization's interactions through various digital and physical stages [35]. The presentation of digitally updated products and services can also be used to improve the customer experience [7]. Furthermore, investments in R&D will allow businesses to develop digitized solutions in advance of client needs rather than reacting to them as they arise [29].

Managerial decisions have a monetary aspect, which revolves around determining how to fund the digital transformation attempt after assessing the financial impact on the current company [13]. The emphasis on promoting advancement is also an important factor to consider [32], with managers being encouraged to view digital advancement as an indispensable portion of their strategy [31]. An advancing digital transformation should be guided by nimble and new adaptable working, as well as a thought of base up advancement processes [36]. Supervisors must also be aware of the critical importance of various capacities, specifically authoritative, innovation-based, item-related, and digital capacities [37]. Directors will be able to pinpoint which current resources can be used in new ways, which capabilities can be used in new ways, and whether or not new abilities could have been introduced into the organization by using a digital focal point to look at their organizations' critical resources and abilities [38]. Many developed countries will be able to export their goods, expand their customer base, and establish trade alliances if the digital divide could be bridged [39].

Organizations are encouraged to look at their employees' skills and variety of abilities, as well as their authority. Organizations should assess the need for establishing a collective virtual workplace and ensure that the transition project is properly staffed [28]. Workers are routinely polled from a growth standpoint, with their careers, aptitudes, and capacities scrutinized [40]. This enables businesses to categorize themselves as part of the digital growth process and to investigate their transition in a systematic manner. More thought is needed about the critical improvements in the organization's way of life that are being made in order to adapt it to fit with technological technologies rather than imposing these advancements on employees.

The authors conduct analysis and think about the eight pillars of digital transformation adoption in virtual geographical point that are listed ofttimes within the past. They focus the majority of their attention on the strategy's previously discussed content, where all is progressively expected. This echoes the idea that transformation is a series of stages that build on each other rather than relying on single events [41].

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